

## **CRUISE INSTRUCTIONS:**

**Draft (27 May 1999)**

NOAA Ship Ferrel

Cruise Number: FE-99-XX

Study Area: Stellwagen Bank National Marine Sanctuary (SBNMS)

Sponsoring Institutions: NOAA's National Ocean Service (NOS), Sustainable Sea Expedition (SSE), National Geographic Society (NGS), National Undersea Research Center at the University of Connecticut (NURC).

Cruise Description and Objectives: This cruise will focus on the ecology of deep boulder reefs at SBNMS. Submersible studies will quantify the day-night behavior of fishes in and above reef structures and patterns in epifaunal invertebrate biodiversity. Ancillary grab sampling will characterize the microbial diversity within sediments surrounding reefs. Outreach activities will include a pier-side open house and daily video summaries of shipboard activities at the New England Aquarium.

Synopsis of Scientific Measurements: behavioral metrics of fishes, video transects, still photographs, grab samples, oceanographic measurements (conductivity, temperature, depth, ambient light).

Chief Scientist: Sylvia Earle

### **1.0 ORGANIZATIONAL STRUCTURE -**

#### **1.1 STRUCTURE**

- *Commanding Officer* - Final approval authority for all operations. Both the Commanding Officer and Dive Supervisor must agree that conditions are acceptable for the submersible to be launched.
- *Dive Supervisor* - Responsible for the procedures and coordination of all dive operations. Both the Commanding Officer and Dive Supervisor must agree that conditions are acceptable for the submersible to be launched.
- *Chief Scientist* - Responsible for collaborating with the CO, Dive Supervisor, and Mission Coordinator to implement the Cruise Plan and to develop the "Plan of the Day" (POD). The Chief Scientist has decision-making authority for any departures from the schedule, planned activities, or personnel.
- *Mission Coordinator* - Responsible for collaborating with the CO, Dive Supervisor, and Chief Scientist to implement the Cruise Plan and to develop the POD. The Mission Coordinator is also responsible for organizing and overseeing the processing, storage and transmittal of data and information collected during submersible dive operations.

- *Principal Investigator* - Responsible for the individual project content.
- *Pilot* - Certified DeepWorker Pilot approved for the specific mission dive.
- *Mission Log Coordinator* - Responsible for compiling the Mission Log for the NGS SSE Web site.

## 1.2 PROTOCOL

*Dive Authority* - The Commanding Officer and the Dive Supervisor will make the final decision on dive operations.

*Project Implementation* - The CO, Dive Supervisor, Chief Scientist, Mission Coordinator, and other required personnel will develop the POD based on the Cruise Plan. Both the Commanding Officer and Dive Supervisor must agree that conditions are acceptable for the submersible to be launched, while the Chief Scientist has decision-making authority for any departures from the schedule, planned activities, or personnel.

## 2.0 OVERVIEW OF OPERATIONS

NOAA, SSE, NGS, NURC at the University of Connecticut, and associated scientists have designed a collaborative research and outreach program using the NOAA Ship Ferrel for field studies at Stellwagen Bank National Marine Sanctuary. The cruise will be conducted from 9 to 13 July 1999. From noon through midnight, the Deepworker submersibles will be used to study day-night variations in the behavior of fishes around deep boulder reefs. From midnight through noon, a limited number of CTD casts and grab samples will be taken from sediments near and away from reef structures to assess patterns in microbial diversity. Video and still photography of shipboard operations will be used to develop outreach materials for daily and post-cruise distribution.

## 3.0 ITINERARY

### JULY

- 2 Ship arrives at USCG pier Boston
- 3 Submersibles and support equipment unloaded. Ship prepares for open house.
- 4 Open house for public. Special events (TBD) for dignitaries.
- 5 At pier. Submersible launch-recovery training/pilot familiarization. (Pilots: Auster, Lindholm).
- 6 Submersible launch-recovery training/pilot familiarization (potential for practice underway).
- 7 Submersible launch-recovery training/pilot familiarization (potential for practice underway).
- 8 Underway - submersible launch-recovery training/pilot familiarization.
- 9 Underway - submersible launch-recovery training/pilot familiarization.

- 10      0000 -Grab sampling, CTD casts  
         1130 - Pre-dive meeting  
         1200 - Station 2224, Dive 1 (Auster)  
         1600 - Station 2224, Dive 2 (Lindholm)  
         2000 - Station 2224, Dive 3 (Auster)
  
- 11      0000 - Grab sampling, CTD casts  
         1130 - Pre-dive meeting  
         1200 - Station 2224, Dive 4 (Lindholm)  
         1600 - Station 2224, Dive 5 (Auster)  
         2000 - Station 2224, Dive 6 (Lindholm)
  
- 12      0000 - Grab sampling, CTD casts  
         1130 - Pre-dive meeting  
         1200 - Station 38, Dive 7 (Auster)  
         1600 - Station 38, Dive 8 (Lindholm)  
         2000 - Station 38, Dive 9 (Auster)
  
- 13      0000 -Grab sampling, CTD casts  
         1130 - Pre-dive meeting  
         1200 - Station 38, Dive 10 (Auster)  
         1600 - Station 38, Dive 11 (Lindholm)  
         2000 - Station 38, Dive 12 (Auster)
  
- 14      0000 -Grab sampling, CTD casts  
         1130 - Pre-dive meeting  
         1200 - Station 38, Dive 13 (Earle)  
         1600 - Station 38, Dive 14 (Lindholm)  
         2000 - Station 38, Dive 15 (Auster)
  
- 15      0000 - Grab sampling, CTD casts  
         0800 - Pre-dive meeting  
         0830 - Station 38, Dive 16 (Earle)  
         1400 - Station 2224, Dive 17 (Auster)  
         1800 - Underway for USCG Pier Boston

#### **4.0 PROJECT DESCRIPTIONS**

Project descriptions can only be considered a guide as to how the Chief Scientist and Principal Investigators expect the projects to progress without the ability to predict the weather, operational and scheduling problems, and equipment failures. (NOTE: Contingency dives provide information on potential alternative dives to be conducted if a scheduled project cannot be conducted at the primary locations.)

#### 4.1 DIVE PROJECTS

Project #1: Day-Night Activities of Fishes at Deep Boulder Reefs

Principal Investigator: Peter Auster

Objective: Collect behavioral metrics of fish behavior

Task: Collect observational data, video, still photographs, CTD and light measurements.

Pilots: Auster, Lindholm

Dives 1-6: Station 2224 - 42 35.65 70 13.30, 74 m, 2.5 hrs

Dives 7-15: Station 38 - 42 29.47 70 13.97, 82 m, 2.5 hrs

Alternative Dive Sites:

Station 12 - 42 35.97 70 17.59, 60 m, 2.5 hrs

Station 40 - 42 33.25 70 33.00, 53 m, 2.5 hrs

Equip Sub: Lights mounted on manipulator, video, 35 mm and flash, CTD, Li-Cor sensor

Equip Ship: none

Project #2: Biodiversity of Deep Boulder Reef Epifauna

Principal Investigator: Sylvia Earle

Objective: Photographic survey of boulder reef epifauna

Task: Collect video transects, still photographs, CTD

Pilots: Earle, TBD

Dives 16: Station 2224 - 42 35.65 70 13.30, 74 m, 3 hrs

Dives 17: Station 38 - 42 29.47 70 13.97, 82 m, 3 hrs

Alternative Dive Sites:

Station 12 - 42 35.97 70 17.59, 60 m, Duration

Station 40 - 42 33.25 70 33.00, 53 m, Duration

Equip Sub: Video, 35 mm and flash, CTD

Equip Ship: none

#### 4.2 OTHER PROJECTS

These are projects related to the cruise, but do not involve dive operations.

Project #3: Patterns in microbial diversity along a gradient from deep boulder reefs

Principal Investigator: Virginia Edgcomb

Objective: Characterize microbial fauna from sediment samples.

Task: Collect sediment samples using grab sampler.

Locations (general locations):

Station 2224 - 42 35.65 70 13.30, 74 m

Station 38 - 42 29.47 70 13.97, 82 m

Alternative Stations:

Station 12 - 42 35.97 70 17.59, 60 m

Station 40 - 42 33.25 70 33.00, 53 m

Equip Ship: Winch and grab sampler.

Project #3: Oceanographic setting.

Principal Investigator: Peter Auster

Objective: Characterize water column structure at dive sites.

Task: Conduct CTD casts and plot data.

Locations (general locations):

Station 2224 - 42 35.65 70 13.30, 74 m

Station 38 - 42 29.47 70 13.97, 82 m

Alternative Stations:

Station 12 - 42 35.97 70 17.59, 60 m

Station 40 - 42 33.25 70 33.00, 53 m

Equip Ship: Winch and CTD.

#### **4.3 OTHER EVENTS**

Event Name: Open House

Purpose: Outreach to public

Primary Participants: Public, Special events (TBD) for dignitaries

Date and Time: 4 July, times TBD

Specific Request From Ship: Meal for dignitaries event. Tours for open house.

Event Name: Media and VIP visits to ship while underway

Purpose: Media coverage of activities, documentation for educational programs, VIP tours

Primary Participants: Media, others TBD

Date and Time: 10-15 July. Times and POBs TBD

Specific Request From Ship: Meals for people on board. The sanctuary vessel HAWK will conduct personnel transfers. Planning now is for one AM and one PM transfer not to exceed 4 POBs. PM transfer will be timed not to interfere with sub ops.

#### **5.0 ANCILLARY PROJECTS**

Ancillary projects are secondary to the objectives of the cruise, should be treated as additional investigations, do not have representation aboard, and are accomplished by the ship's force.

5.1. Obtain data on human-impacted marine mammals. Priorities are human-impacted (ship strikes, net entanglements, other) right whales, human-impacted humpback whales, all other human-impacted marine mammals and turtles, and sightings of right whales.

#### **6.0 OPERATIONAL PLANS**

##### **6.1 PLANS FOR SUBMERSIBLE PROJECTS**

The length of Project #1 dives will be scheduled to accommodate 3 dives per day. This will allow collection of data for day, dusk, and night periods. Each dive plan will be similar: 1) conduct 15 minute transect for relative abundance of fishes, 2) park sub and collect activity data at set intervals, 3) reposition sub at new site and collect activity data (number of observations periods depend on total dive time available), 4) 15 minutes for video and still photography for documentation/outreach.

Project #2 will focus on video and still photography documentation of invertebrate diversity on hard substrates. The sub will collect video and still images from individual boulder and cobble surfaces at set depth intervals.

## 6.2 PLANS FOR OTHER PROJECTS

Project #3 will require a grab sampler and lab space for a compound microscope with video output. Grab samples will be taken at night or in early morning so as not to interfere with the acoustics sampling. The timing of this work will be dependent on the transport schedule using the sanctuary's vessel HAWK. The Principal Investigator may arrive on board during early morning and take samples prior to submersible operations. Alternatively, the work may be conducted at night with the Principal Investigator arriving on board at night (using the HAWK for transport) and departing in the morning.

Project #4 will require the aid of the Ferrel technicians to conduct CTD casts at dive sites. Triplicate casts should be conducted after diving operations have been secured (after 0000) and before they commence (1100). Plotted data should be available before diving commences.

## 6.3 PLANS FOR OTHER EVENTS

The open house on 4 July will be coordinated with Anne Smrcina (SBNMS Education Coordinator). There have been ongoing discussions regarding VIP lists and a potential meal on board.

Documentary photographers, media and VIP access to the vessel while underway will be coordinated by Anne Smrcina. The Sanctuary Vessel HAWK and a charter vessel will be used for transportation. An early morning and early evening rendezvous will be planned. Timing of arrival and departure at the Ferrel will be determined so not to interfere with submersible or other sampling activities.

## 6.4 PLANS FOR ANCILLARY PROJECTS

6.4.1. Information, Priorities, and Protocols for Marine Mammal Sightings: The northeast region marine mammal sighting and reporting network requires data on human-impact events on endangered species. Recognizing that this is generally secondary to the primary mission of the cruise, only high priority events should be targeted. These events will be infrequent (expected to occur a few times a year, so most cruises will not have any encounters). The high priority events are: (1) human-impacted (ship strikes, net entanglements, other) right whales, (2) human-impacted humpback whales, (3) all other human-impacted marine mammals and turtles, and (4) sightings of right whales. In order to implement a sighting protocol on each cruise leg, one member of the ship's officers and one from the scientific party should be designated with specific responsibility for this task. The bridge watch should include observation and reporting of these events as part of their normal duties, with verification and documentation shared with the designated member of the science party. Attachment 2 contains sighting forms, instructions, and information for species identification. Reports should be forwarded by the Chief Scientist to David Potter, Northeast Fisheries Science Center, Woods Hole, MA 02543.

## **7.0 CONTACT PERSONNEL**

*Chief Scientist:* Sylvia Earle (alternate - Francesca Cava)

*Scientific Operations:*

Peter Auster  
National Undersea Research Center  
University of Connecticut at Avery Point  
1084 Shennecossett Rd.  
Groton, CT 06340  
860-405-9121  
860-445-2969  
auster@uconnvm.uconn.edu

*Outreach Activities:*

Anne Smrcina  
Stellwagen Bank National Marine Sanctuary  
175 Edward Foster Rd.  
Scituate, MA 02066  
781-545-8026  
781-545-8036  
asmrcina@ocean.nos.noaa.gov

## **8.0 SCIENTIFIC PERSONNEL**

8.1 The Chief Scientist is authorized to alter the scientific portion of this cruise plan with the concurrence of the Commanding Officer, provided that the proposed changes will not: (1) jeopardize the safety of personnel or the ship, (2) exceed the time allotted for the cruise, (3) result in undue additional expense, or (4) change the general intent of the project.

### 8.2 PARTICIPATING PERSONNEL

Name	Gender/ Nationality	Position	Organization	Dates on Board
Chief Scientist	F/USA	CS		3-15
Peter Auster	M/USA	MC/PI/P	NURC,UConn	3-15
James Lindholm	M/USA	P	NURC,UConn	3-15
SBNMS Photog.	M/USA	Photographer	SBNMS	3-15
SSE Photographer				3-15
Nuytco Tech				3-15
Nuytco Tech				3-15
Nuytco Tech				3-15

Total POB 8.

CS=Chief Scientist, MC=Mission Coordinator, PI=Principal Investigator, P=Pilot, AS=Research Assistant,

There will be up to 8 additional POBs during the day for Sanctuary and media personnel. They will be transported to Ferrel via smallboat.

## **9.0 DATA RESPONSIBILITIES**

### **9.1 DATA AND SAMPLES**

9.1.1 The Chief Scientist via the Mission Coordinator is responsible for the data quality, disposition, and archiving of data and samples collected aboard the ship for the primary project. As the representative of the cruise sponsor, the Chief Scientist is also responsible for the dissemination of copies of these data to participants on the cruise and to any other requesters.

9.1.2 The Commanding Officer will give the acting Chief Scientist a single copy of all data collected by ship's personnel. The ship's Scientific Computer System (SCS) will collect data continuously during the project. The SCS data will be provided to the Chief Scientist at the completion of the project. The Chief Scientist will provide the Commanding Officer a list of all data collected by the scientific party.

9.1.3 The Commanding Officer is responsible for all data collected for ancillary projects until those data have been transferred to the projects' Principal Investigator.

### **9.2 RECORDS AND REPORTS**

9.2.1 Marine Operations Abstract (MOA). Ferrel's officers will maintain the MOA during the cruise. The ship's position will be entered for all operations, and otherwise every 30 minutes or when changing course or speed. The Commanding Officer will give the Mission Coordinator a copy of the MOA at the completion of the project.

9.2.2 Pre Dive forms will be used to check out the sub prior to each dive and are the responsibility of the pilot and dive crew. Pre Dive forms will be signed by the Dive Supervisor.

9.2.3 Dive Logs will be used to keep track of the subs performance during each dive and are the responsibility of the Dive Supervisor or designee.

9.2.4 The Mission Coordinators Log will provide an accounting of the project work being conducted during each dive and are the responsibility of the Mission Coordinator.

9.2.5 The Mission Log will be based on a compilation of materials collected during dive operations (audio, video, photographs) and information collected post-dive (text provided by pilots), and will be posted on the NGS SSE Web site. The Mission Log is the responsibility of the Mission Log Coordinator.

9.2.6 The Mission Coordinator will complete the Ships Operations Evaluation Form and forward to the Office of NOAA Corps Operations.

9.2.7 All film collected during the cruise will be handled in accordance with the MOU between NOAA and NGS.

## **10.0 EQUIPMENT LISTS**

### **Sub provided equipment**

Color video camera and lights on pan-tilt  
paired parallel lasers for scaling in video  
light(s) mounted on manipulator  
35 mm camera and electronic flash  
sector scanning sonar  
CTD sensors

### **PI provided equipment**

Li-Cor light sensor and datalogger (Auster)  
Digital camcorder and external DC power cord (Auster)  
Night-vision equipment (Auster)  
Binocular microscope and video camera (Edgcomb)

### **Vessel provided equipment**

CTD  
Grab sampler

## **11.0 MISCELLANEOUS**

11.1 Navigation Control: Shipboard DGPS provided for vessel. Submersible navigation provided by NUYTCO.

11.2 Required Compliance: The Chief Scientist will require each Mission Coordinator to contact local authorities to increase the safety and awareness of the operations. These authorities include:

11.2.1 US Coast Guard Station responsible for the area of coverage in the cruise instructions.

11.2.2 Local Notice to Mariners in the district concerning the area covered in the cruise instructions.

11.2.3 Port Authority or Harbor Master for potential dive sites.

11.3 Meals for all scientific party members will be charged to the host organization in accordance with NOAA Administrative Order 203-100. The Chief Scientist and Mission Coordinator will provide the Commanding Officer with the appropriate accounting codes.

11.4 Pre-Cruise Meeting: A pre-cruise meeting between the Chief Scientist, the Commanding Officer, the Mission Coordinator, and the Dive Supervisor will be held prior to the commencement of operations to do a final review of the cruise plan.

11.5 Post-Cruise debrief: A post-cruise meeting between the Chief Scientist, the Commanding Officer, the Mission Coordinator, the Dive Supervisor and the Mission Coordinator for the next site will be held to review any problems that occurred.

11.6 HAZMATS - Formalin

## **12.0 COMMUNICATIONS**

12.1 Ferrel will communicate daily, Monday through Friday, with the Atlantic Marine Center. Normally this will be via message, but radio contact will be maintained when possible.

12.2 Because the scientific staff must sometimes communicate with other research vessels, commercial vessels, and shore-based NOAA facilities, the Chief Scientist, Mission Coordinator, or their designee may request the use of radio transceivers aboard the vessel.

12.3 Ferrel is equipped with INMARSAT and cellular telephone. The Chief Scientist and Mission Coordinator may need access to these systems with permission from the Commanding Officer. The Commanding Officer will provide the Chief Scientist with a log of all calls made from the ship by the scientific party at the completion of the project.

## **13.0 APPENDICES**

- A. Chartlets
- B. Shoreside transportation schedule
- C. Emergency contact information

John C. Albright  
Rear Admiral, NOAA  
Director, Pacific Marine Center

Date

Sylvia Earle  
Chief Scientist  
Sustainable Seas Expedition

Date

Peter Auster